

APPENDIX A

WASTE AND LEACHATE CONCENTRATIONS

Table A.1 Benzene Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Claus Catalyst	0	0
Coke Fines (Off-Spec Product and Fines)	0	0.005
	0	0.025
	0	1.5
	0	0.625
	0	0.023
	0	0.625
Crude Oil Tank sludge	0.13	8.2
	1.6	220
	1.7	69
	0.56	52
	0.032	0.66
	0.05	2.5
CSO sludge	0.05	1.25
	0.08	1.2
	0.05	1.25
	0.05	2.5
Desalting sludge	5.2	230
	1.7	22
	0.28	28
Extraction clay	0.05	2.5
	0.045	62.5
FCC Catalyst and Fines	0	0
H ₂ SO ₄ Sludge	0	0
HF Sludge	0.05	14
	0.05	0.625
	0.05	0.313
	0.05	0.65
	0.18	6.1
HF treating clay	0	0.067
	0	0.025
	0	0.625
	0	0.65
Hydrocracking catalyst	0.05	1.25
	0.23	15
	10	370
Hydrotreating	0.11	4.2
	0.16	27
	4.2	100
Hydrotreating	0.05	2
	0.17	9.4
	0.25	2.9
	3.7	24
	4.2	160
	39	500
Isomerization clay	0.05	2.5
	0.045	62.5
Phosphoric acid catalyst	0	0

Table A.1 Benzene Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Process sludge-resid upgrade	2.6	73
Reforming catalyst	0.05	0.025
	0.086	2.3
	0.042	0.43
	0.05	0.57
Residual oil sludge	0.11 ⁴	0
	0.05 ⁴	0
SCOT	0	0.005
	0	0.625
	0	0.06
Off-spec Sulfur	0	0
Sulfur sludge	0.05	0.25
	0.05	0.096
	0.05	1.25
	0.05	0.625
	0.026	0.42
Treating clay-filtering	1.25	125
	0.1	8.5
	0.04	0.54
	0.05	0.625
Unleaded	0.06	2.7
	0.6	43
	1.6	110
Dimersol Catalyst	0	0

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.
4. In cases where analyses indicated the presence of a constituent in the TCLP data but not in the total concentration data, the TCLP data were assigned zero concentration to preserve contaminant mass.

Table A.2 Arsenic Concentration Data^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Claus Catalyst	0	13
	0	5
	0	10
Coke Fines (Off-Spec Product and fines)	0	0
Crude Oil Tank sludge	0	6
	0	8.3
	0	32
	0	5.7
	0	18
	0	19
CSO sludge	0	4.7
	0	5
	0	5
	0	1
Desalting sludge	0	16
	0	34
	0	16
	0	0.05
Extraction clay	0	0
FCC Catalyst and Fines (both)	0	11
	0	1
	0	2.2
	0	3.3
	0	1
	0	2.5
H ₂ SO ₄ Sludge	0	2.4
HF Sludge	0	5.7
	0	0.2
	0	1
	0	5
	0	5.3
HF treating clay	0	26
	0	13
	0	5
	0	5
Hydrocracking catalyst	0	12
	0	29
	0	5
Hydrotreating	0.23	100
	6.9	730
	34	650
Hydrotreating	0.03	66
	0.05	120
	0.05	42
	0.05	1600
	1.5	460
	4.9	71
Isomerization clay	0	0

Table A.2 Arsenic Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Phosphoric acid catalyst	0.19	210
	0.05	1
	0.05	5.3
Process sludge-resid upgrade	0	43
Reforming catalyst	0	10
	0	45
	0	20
	0	20
	0	10
	0	11
Residual oil sludge	0	3
	0	1
SCOT	0	10
	0	20
	0	28
Off-spec Sulfur	0	0
Sulfur sludge	0.05	33
	0.05	1
	0.05	1
	0.05	120
	0.49	17
Treating clay-filtering	0.05	3.2
	0.05	1
	0.05	14
	0.13	16
Unleaded	0	35
	0	240
	0	17
Dimersol Catalyst	0.19	210
	0.05	5.3

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3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.3 Nickel Concentration Data^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Claus Catalyst	0	0
Coke Fines (Off-Spec Product and fines)	0	46
	0	12
	0	34
	0	15
	0	120
	0	8.5
Crude Oil Tank sludge	0	64
	0	380
	0	61
	0	15
	0	82
	0	74
CSO sludge	0.2	120
	0.2	62
	0.2	300
	0.52	160
Desalting sludge	0.2	76
	0.2	100
	0.52	110
Extraction clay	0	0
FCC Catalyst and Fines (both)	0.2	73
	0.79	130
	3.4	900
	7.5	780
	0.2	330
	1.1	91
H ₂ SO ₄ Sludge	17	280
HF Sludge	0.2	730
	0.4	4.1
	0.46	220
	0.5	57
	4.3	78
HF treating clay	0	0
Hydrocracking catalyst	0.43	27000
	3.6	28000
	110	19000
Hydrotreating	0.73	8
	17	850
	67	14000
Hydrotreating	0.91	66
	37	25000
	210	20000
	250	20000
	310	24000
	67	7500
Isomerization clay	0	0
Phosphoric acid catalyst	160	9600
	67	75000

Table A.3 Nickel Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Process sludge-resid upgrade	0	90
Reforming catalyst	0.2	8
	0.72	220
	0.65	12
	0.2	8.1
	0.2	4
	3.6	190
Residual oil sludge	0	410
	0	83
SCOT	0.58	120
	0.54	73
	0.2	18
Off-spec Sulfur	0	4
	0	4
	0	21
	0	4
Sulfur sludge	0.2	60
	0.2	19
	1.2	750
	2.5	60
	5.9	240
Treating clay-filtering	0	16
	0	4
	0	4
	0	31
Unleaded	0.2	20
	6.7	550
	80	4900

1. Data from USEPA 1995a and 1996a.
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3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.4 Benz(a)anthracene Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/L	Cw mg/L
Claus Catalyst	0	0
Coke Fines (Off-Spec Product and fines)	0.050	28
	0.050	8.7
	0.013	15
	0.050	10
	0.050	10
	0.050	0.17
Crude Oil Tank sludge	0	10.31
	0	4.13
	0	31
	0	49.5
	0	11.5
	0	0.41
CSO sludge	0	390
	0	20.63
	0	360
	0	41.25
Desalting sludge	0	0
Extraction clay	0	0
FCC Catalyst and Fines (both)	0	0.17
	0	0.17
	0	0.08
	0	0.17
H ₂ SO ₄ Sludge	0	0.27
HF Sludge	0	0
HF treating clay	0	0
Hydrocracking catalyst	0	0.17
	0	6.9
	0	10.31
Hydrorefining	0	0
Hydrotreating	0	0.66
	0	14
	0	0.17
	0	0.17
	0	0.17
	0	0.17
Isomerization clay	0	0
Phosphoric acid catalyst	0	2.06
	0	0.99
	0	0.17
Process sludge-resid upgrade	0	0
Reforming catalyst	0	4.5
	0	0.66
	0	0.17
	0	0.17
	0	0.17
	0	0.17
Residual oil sludge	0	480
	0	9.2
SCOT	0	0

Table A.4 Benz(a)anthracene Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/L	Cw mg/L
Off-spec Sulfur	0	0
Sulfur sludge	0	0
Treating clay-filtering	0	0
Unleaded	0	0

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.5 Toluene Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Hydrotreating Catalyst	1.8	0.625
	0.74	120
	0.1	7.9
	0.21	16
	4.2	30
	39	1300

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.6 Benzo(a)pyrene Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Waste Conc. mg/kg
Off-Spec Product and Fines	0.01	9.4
	0.05	7
	0.05	7.2
	0.05	33
	0.05	13

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.7 Cadmium Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Hydrotreating Catalyst	0.01	2.5
	0.03	0.5
	0.03	0.5
	0.03	1
	0.03	1.7
	0.08	12
SCOT Catalyst	0.03	6.5
	0.03	5.7
	0.2	9.4

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.8 Vanadium Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
SCOT Catalyst	0.25	260
	1.4	72
	1.9	210
Hydrocracking Catalyst	0.25	37
	0.25	49000
	4.7	140000

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.

Table A.9 3/4-Methylphenol Concentration Data ^{1,2,3}

Waste Stream	TCLP mg/l	Cw mg/kg
Crude Tank Sludge	0.05	10.313
	0.05	4.125
	0.49	12
	0.05	49.5
	0.05	11.5
	0.05	0.413
Hydrotreating Catalyst	0.012	0.95
	0.05	4.2
	0.05	0.165
	0.075	4.125
	0.096	0.165
	0.79	2.1
HF Alkylation Sludge	0.05	1
	0.05	5.157
	0.05	2.063
	0.05	0.165
	1.2	32

1. Data from USEPA 1995a and 1996a.
2. Each line represents a single sample with paired TCLP and total concentration measurements.
3. The values listed are either the measured concentration or one-half the detection limit (if the constituent was undetected). Zeros are listed when the constituent was not detected in any sample of a given type.